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REMARKS/ARGUMENTS

The Office Action raised no objections to the specification. Applicants have provided certain substitute paragraphs including new paragraph [0032] which merely moves deleted text from paragraph [0032] into a separate paragraph for the purpose of addressing certain clerical matters.

Claims 1, 5-7, 11, 15-19, 30 and 31 were rejected under 35 U.S.C. 102(e) as being anticipated by USPN 6,626,164 to Hitomi et al ("Hitomi").

Hitomi discloses a four-cycle engine having adjustable valve timing. In medium- to high-speed ranges in medium- to high-load regions the exhaust valve is closed before top dead center (BTDC) intake and the intake valve is opened after top dead center (ATDC) intake (i.e. minus overlap). Hitomi further discloses the negative valve overlap is longer in the medium-speed range than in the high-speed range in the medium- to high-load regions of the engine. A low-load range is disclosed wherein minus overlap is characterized by exhaust valve closure 5 degrees or more BTDC and intake valve opening ATDC such that the period from exhaust valve closure to TDC intake is less than the period from TDC intake to the intake valve opening to reduce pumping loss. (col. 9, ll. 15-28; col 11, ll. 46-57). Hitomi references FIG. 7 in describing the pumping loss reduction, disclosing that the combustion chamber pressure increases from a level corresponding to the exhaust gas pressure (i.e. the top horizontal pressure trace adjacent the left pointing arrow in FIG. 7) and decreases from TDC down to a level corresponding to the intake pressure (i.e. the

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bottom horizontal pressure trace adjacent the right pointing arrow in FIG. 7). Hitomi merely describes what one skilled in the art would understand to be the relaxation of trapped compressed exhaust gases to substantially atmospheric intake pressure.

Applicants' present invention includes claim limitations that are directed toward establishing sub-atmospheric pressure conditions, low pressure events or low pressure conditions within the combustion chamber, not the mere relaxation of high combustion chamber pressures due to trapped and compressed exhaust gases. Applicants recognize the benefits of such relaxation (see specification para. 0026) – but this is not what Applicants are claiming. Applicants present invention in some embodiments also includes a rebreathe event exhaust valve opening for reingesting exhaust gases vis-à-vis a second opening of the exhaust valve distinct from the exhaust event exhaust valve opening. (see specification and exhaust event profile 50 distinct from rebreathe profiles 52, 54 in FIG. 2).

With respect to the present invention's sub-atmospheric pressure conditions, low pressure events or low pressure conditions, Applicants cannot find in Hitomi the following element of claim 1:

subsequent to the exhaust event, providing a period of simultaneous closure of the exhaust and intake valves during at least a portion of the intake stroke of the piston effective to establish a sub-atmospheric pressure condition within the combustion chamber;

Applicants cannot find in Hitomi the following element of claim 15:

establishing a low pressure event within the combustion chamber during the intake stroke of the piston;

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Nor can Applicants find in Hitomi the following element of claim 30:

- providing a closed exhaust valve and a closed intake valve during an intake stroke of said piston to establish a low pressure condition within the combustion chamber;

Furthermore, with respect to the present invention's rebreathe events, Applicants cannot find in Hitomi the following element of claim 5:

providing a rebreathe event wherein said exhaust valve is open during at least a portion of the intake event.

Applicants cannot find in Hitomi the following element of claim 15:

establishing a combustion chamber rebreathe event during the intake stroke of the piston by controlling a rebreathe event exhaust valve opening and closing wherein the rebreathe event exhaust valve opening occurs during the low pressure event.

Nor can Applicants find in Hitomi the following element of claim 30:

providing an open exhaust valve and an open intake valve during said intake stroke of said piston to ingest combusted gases and fresh air, respectively, into said combustion chamber;

An anticipatory reference must be enabling, see **Akzo N.V. v. United States Int'l Trade Comm'n**, 808 F.2d 1471, 1479, 1 U.S.P.Q.2D (BNA) 1241, 1245 (Fed. Cir. 1986), cert. denied, 482 U.S. 909, 96 L. Ed. 2d 382, 107 S. Ct. 2490 (1987), so as to place one of ordinary skill in possession of the claimed invention. **In re Spada**, 911 F.2d 705, 708, 15 U.S.P.Q.2D (BNA) 1655, 1657 (Fed. Cir. 1990); see **Seymour v. Osborne**, 78 U.S. 516, 555, 20 L. Ed. 33 (1870) ("The knowledge supposed to be derived from the publication

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must be sufficient to enable those skilled in the art or science to understand the nature and operation of the invention."). **Elan Pharmaceuticals Inc. v. Mayo Found. for Med. Educ. and Research**, 304 F.3d 1221, 64 USPQ 2d 1292, 1296 (Fed. Cir. 2002). The single reference must describe and enable the claimed invention, including all claim limitations, with sufficient clarity and detail to establish that the subject matter already existed in the prior art and that its existence was recognized by persons of ordinary skill in the field of the invention. **Crown Operations International, Ltd. v. Solutia Inc.**, 289 F.3d 1367, 1375, 62 USPQ 2d 1917, 1921 (Fed. Cir. 2002); **In re Spada**, 911 F.2d 705, 708, 15 USPQ 2d 1655, 1657 (Fed. Cir. 1990) ("the reference must describe the applicant's claimed invention sufficiently to have placed a person of ordinary skill in the field of the invention in possession of it").

Functional language is specifically authorized by **In re Swinehart**, 439 F.2d 210, 169 USPQ 226 (CCPA 1971); **In re Caldwell**, 138 USPQ 243 (CCPA 1963); **Lewmar Marine, Inc. v. Barient, Inc.**, 827 F.2d 744, 3 USPQ2d 1766 (Fed. Cir. 1987) ("so that" functional clause of claim renders reference non-anticipating); **M.P.E.P. § 2173.05(g)**.

A prior art reference must disclose every limitation of the claimed invention, either explicitly or inherently, to anticipate. **In re Schreiber**, 128 F.3d 1473, 1477 (Fed. Cir. 1997).

If all the elements are not expressly stated in a single reference, a claim may only be anticipated if non-disclosed elements would have been inherent in the prior art. And, under the principals of inherency, the prior art must necessarily function in accordance

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with, or include the claim limitations, it anticipates. **Telemac Cellular Corporation v. Topp Telecom Inc.**, 247 F.3d 1316 (Fed. Cir. 2001) relying on **MEHL/Biophile Int'l Corp. v. Milgraum**, 192 F.3d 1362, 1365 (Fed. Cir. 1999). Before a reference can be found to disclose a feature by virtue of its inherency, one of ordinary skill in the art viewing the reference must understand that the unmentioned feature at issue is necessarily present in the reference. **Continental Can Co. USA v. Monsanto Co.**, 948 F.2d 1264, 1268 69, 20 USPQ 2d 1746, 1749 50 (Fed. Cir. 1991). The test of inherency is not satisfied by what a reference "may" teach. *Id.*, 20 USPQ 2d at 1749 50 ("Inherency . . . may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.")

When the PTO asserts that there is an explicit or implicit teaching or suggestion in the prior art, it must indicate where such a teaching or suggestion appears in the prior art. **In re Rijckaert**, 9 F.3d 1531, 1533, 28 USPQ 2d 1955, 1957 (Fed. Cir. 1993) (citing **In re Yates**, 663 F.2d 1054, 1057, 211 USPQ 1149, 1151 (C.C.P.A. 1981)). It is the responsibility of the examiner to provide a basis in fact and/or technical reasoning to reasonably support the determination that inherent characteristics necessarily flows from the teachings of the applied prior art. **Ex parte Levy**, 17 USPQ 2d 1461, 1464 (B.P.A.I. 1990) (emphasis original). **M.P.E.P. § 2112**. It is incumbent on the examiner to point to the "page and line" of the prior art which justifies an inherency theory. **Ex parte Schricker**, 56 USPQ 2d 1723, 1725 (B.P.A.I. 2000) (unpublished).

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Applicants cannot find in Hitomi any disclosure directed toward establishing sub-atmospheric pressure conditions, low pressure events or low pressure conditions within the combustion chamber as claimed in the present application. Nor can Applicants find in Hitomi any disclosure directed toward rebreathe events. Hitomi fails to enable one skilled in the art to understand the nature and operation of Applicants invention. In fact, Hitomi nowhere expressly discloses establishing sub-atmospheric pressure conditions, low pressure events or low pressure conditions within the combustion chamber. Moreover, the Office Action provided no adequate basis for finding the missing elements inherently in Hitomi. Hitomi does not anticipate, expressly or under the principals of inherency, Applicants' invention as claimed. For the above reasons, Applicants respectfully traverse the anticipation rejection in view of Hitomi under 35 U.S.C. 102(e) of claims 1, 5-7, 11, 15-19, 30 and 31.

Claims 2-4, 8-10, 12-14, 20-29, 32-36 were rejected under 35 U.S.C. 103(a) as being unpatentable over Hitomi in view of design choice. Specifically, the Office Action asserts that "the various particular pressures, lift ranges and angular ranges would have been an obvious matter of design choice well within the level of ordinary skill in the art depending on design variables such as engine load and speed requirements. Moreover, there is nothing in the record which establishes that the claimed applied forces presents a novel or unexpected result." (citing In re Kuhle, 526 F.2d 553, 188 USPQ 7 (CCPA 1975).

Obviousness conclusions based on a single reference must be supported by some suggestion or motivation to modify the teachings of that reference. In re Werner Kotzab,

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217 F.3d 1365 (Fed. Cir. 2000). In Kotzab, the Court observed that such suggestion or motivation "may come explicitly from statements in the prior art, the knowledge of one of ordinary skill in the art, or, in some cases the nature of the problem to be solved." For the reasons above explaining the failure of Hitomi as an anticipating reference, Hitomi also fails to provide an adequate basis for a *prima facia* obviousness rejection in as much as those missing claim limitations fail to be set forth expressly or inherently therein. Nor has the Office Action has proffered any suggestion or motivation in the prior art for providing the sub-atmospheric or low pressure events or conditions variously required by all of Applicants claims and absent from Hitomi. Hitomi is ineffective to suggest or motivate one skilled in the art toward the establishment the claimed sub-atmospheric or low pressure events or conditions of the present invention. It is therefor an unsupportable extension of Hitomi then to provide the basis of any design choice conclusions with respect to the various specific chamber pressures, valve lifts and angles to establish such sub-atmospheric or low pressure events or conditions in accordance with the present invention set forth in claims 2-4, 8-10, 12-14, 20-29 and 32-36. Such design choices presuppose the alleged anticipatory value of Hitomi which Applicants have successfully traversed. Nor has the Office Action provide any basis from the prior art or one skilled in the art to support such naked conclusions and should such alleged basis be maintained Applicants require sufficient documentation to support such conclusory statements.

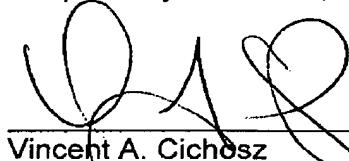
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Applicants verily believe that the pending claims are in condition for allowance.

Applicants therefor respectfully request that all claims 1-36 as presented herein be allowed to proceed to issue.

Respectfully submitted,



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